



**UNITED STATES DEPARTMENT OF COMMERCE**  
**Patent and Trademark Office**

Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/012,674	01/23/98	PRATER	19536-706-00

LM02/0510  
MCCUTCHEN DOYLE BROWN & ENERSEN  
THREE EMBARCADERO CENTER  
SAN FRANCISCO CA 94111

EXAMINER	
SEALEY, L	
ART UNIT	PAPER NUMBER
2772	

DATE MAILED: 05/10/00

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

# Office Action Summary

Application No.

09/012,674

Applicant(s)

Prater

Examiner

Lance Sealey

Group Art Unit

2772



☒ Responsive to communication(s) filed on Feb 29, 2000

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire three month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

## Disposition of Claims

☒ Claim(s) 1-10 is/are pending in the application.

Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 1-10 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been  
☐ received.

☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 8

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

Art Unit: 2772

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishita et al., "Continuous Tone Representation of Three-Dimensional Objects Illuminated by Sky Light" ("Nishita") in view of the Persistence of Vision(tm) Ray-Tracer software ("POV-Ray").

3. POV-Ray discloses:

- (claim 1) constructing one or more finite light sources within a computer animated scene, each of the finite light sources having a finite size and center (4.6.6); and
- (claims 1, 7) constructing a plurality of surfaces with the scene, each surface consisting of a plurality of points (4.6.5; implied by discussion of the behavior of light around objects, which have a plurality of surfaces).

4. However, POV-Ray does not disclose the approximation of the illumination effect of each of the finite light sources, or a hemispherical light source, by the use of a plurality of point light

Art Unit: 2772

sources of varying intensity; a situation wherein each of the finite light sources illuminates each of the points; the approximate calculation of a light intensity and light vector direction as a function of the portion of each of the light sources which illuminates each of the points; approximating the light vector direction as a function of the portion of the light source which shines upon a point; and the situation in which the finite light source is a hemisphere of infinite radius of a sphere.

These elements are disclosed by Nishita.

5. Nishita, in disclosing an improved model for natural lighting calculations that adequately considers both direct sunlight and skylight, also discloses:

- (claims 1, 7) approximation of the illumination effect of each of the finite or hemispherical light sources by the use of a plurality of point light sources of varying intensity (p.125, second column, last paragraph);
- (claim 2) each of the finite light sources illuminates each of the points (p.125, second column, last paragraph);
- (claims 3, 8) the approximate calculation of a light intensity and light vector direction as a function of the portion of each of the light sources which illuminates each of the points (FIG.4(a), p. 128; note arrows that indicate the direction of skylight being projected on the surface);
- (claims 4, 10) calculation of the light intensity as a function of the portion of the light source which illuminates each of the points (p.125, second column, last paragraph);

Art Unit: 2772

- (claims 5, 9) approximation of the light vector direction as a function of the portion of the light source which shines upon a point (FIG.4(a), p.128);
- (claim 6) the finite light source is a sphere (the sun; p. 125, second column, third paragraph);
- (claim 7) constructing a hemispherical light source of infinite radius (p. 125, second column, fourth paragraph, second sentence);

6. Therefore, it would have been obvious to one of ordinary skill in the art to have modified the Nishita model for natural lighting calculations in view of the POV-Ray light source by incorporating POV-Ray's light source input into Nishita's calculation code (see Nishita, p. 130, second column, second full paragraph). Such a modification to Nishita would provide a more accurate image because of the ability to take into account the "umbra" of a light source (see POV-Ray, 4.6.5, first paragraph, next to the last sentence).

***Response to Remarks***

7. Applicant's arguments filed 2/29/00 have been fully considered, but are moot in view of new grounds of rejection; as a result this action is non-final.

***Conclusion***

8. Any inquiry concerning this communication should be directed to Exr. Lance W. Sealey at (703) 305-0026 (voice), (703) 308-6606 (fax).



MARK ZIMMERMAN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2700